E907

- Secondary particle production experiment in $\pi^{\pm}$,$K^{\pm}$,$p^{\pm}$ interactions on various nuclear targets and hydrogen as a function of beam energy from 5 GeV/c to 120 GeV/c.
- requested proton rate: from 10^8 to 10^{11} protons/s
  - beamline max: 10^{11} protons/s
  - drift time across TPC: 16 μs
  - TPC readout rate: 60 Hz ('91 electronics, upgradable with ~ 0.5 M$ to 1500 Hz)
- spill structure: either bunched or debunched
- desired running period: summer'03 to summer '05

E907

- "double slow spill" mode: inject 2 batches in MI
  - single turn extract one batch to pbar target
  - put the second batch close to the slow spill half integer resonance and extract a small fraction of the beam (<10%) to SY120 in ~ 1 s. Set MI tune back to normal, single turn extract the remaining of the batch to pbar target

    what about emittance of remaining of the batch ? Test performed in 2000 with low intensity beam (5 10^{11} protons) for 0.3 s looked ~ OK.
- power consumption with "double slow spill" is slightly higher than "single slow spill" in MI TDR

  mix pure stacking cycle with "double slow spill" in one to one ratio

E906

- Precise measurements of the ratio d-antiquark/u-antiquark in the proton, using Drell-Yan reactions at 120 GeV
- location of the experiment: not decided yet
- upper limit on acceptable proton rate: 10^{12} protons/s
- spill structure: either bunched or debunched
  - debunched beam requires additional electronics for the trigger, but it's going to be a better experiment
- total proton demands
  - d-bar/u-bar: 3.4 10^{18} protons
  - nuclear u-bar: 1.8 10^{18} protons
  - ☛ 5.2 10^{18} protons in 9 months (66% accelerator efficiency) with a dedicated 2.9 s slow resonant spill (1 s flattop)
- running period:
  - after E907 in a "double slow spill" mode ?
  - simultaneously with CKM ?

CKM

- 120 GeV protons, resonantly extracted over a slow spill of at least 1 s
- upper limit on acceptable proton rate: 5 10^{12} protons/s
- spill structure: debunched with a residual ~10% 53 MHz modulation
- total proton demands
  - 6 10^{19} protons in 2 years (39 weeks/year, 120 hours/week) at a rate of 6 10^{15} protons/hour (3 10^{13} every 20 s)

To be able to run single turn and slow resonant extraction in a same spill we would need to significantly improve the fall time of the NuMI kickers, but this mode of operation doesn't seem to be of any particular advantage.

Up to now no major technical impediment has been identified for a CKM dedicated cycle, with up to 6 s resonant extraction, if limited to a maximum rate of one every 20 s. Further investigations are necessary here.

The procedure of debunching the beam has to take into account beam loading and residual 53 MHz voltage on the cavities and the requirements imposed by the extraction line on the momentum spread of the beam. We need to better understand the requirements of CKM on the spill structure, other than the residual modulation at 53 MHz.

The present layout of the resonant extraction equipment in the Main Injector is probably not adequate. A new design needs to be developed including additional calculations to determine the level of losses and how to best control them.

Additional shielding material has to be added in the tunnel around the extraction region.